U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Office of Information Services
Chief Information Officer

CMS Target Architecture

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CMS
CENTERS for MEDICARE & MEDICAID SERVICES

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1. FOREWARD

This document provides the framework for the Target Architecture component of the Enterprise Information Technology Architecture at the Centers for Medicare & Medicaid Services (CMS).

Based on industry and government architecture standards, this Architecture is considered acceptable, agile, and malleable for CMS. The Office of Information Services' (OIS) Deputy Director for Technology/Chief Technology Officer leads the development of this architecture with the support of all OIS components and input from other CMS Centers and Offices. All comments and recommendations were considered for incorporation into this document.

This Architecture has been reviewed and accepted as a component of CMS' Enterprise Architecture and Standard in accordance with CMS' Information Technology governance process. It is a conceptual "to-be" architecture and serves as a blue print for the implementation of in-house and contractor systems that support CMS business operations.

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2. BACKGROUND

As mandated by the Clinger-Cohen Act (CCA) of 1996, Centers for Medicare & Medicaid Services (CMS) has been working to develop an enterprise architecture that will be the integrated framework for maintaining and evolving existing information technology (IT) and acquiring new IT to achieve the agency's strategic goals and information resources management goals. The objectives of CMS' enterprise IT architecture are:

- To promote interoperability and connectivity among dissimilar systems that must function together or provide service to each other.

- To provide the ability to manage change, whether driven by legislation, policy, business logic, organizational structure, IT infrastructure, product upgrades, and vendor consolidations or failures.

- To foster the identification and reuse of components and services to avoid duplicative implementations that add costs.

- To identify areas for new development and to highlight legacy systems that must be retired.

An enterprise architecture not only describes the current and desired relationships among business and management process, data, and information technology, it also establishes a target for the future. The target architecture represents what CMS intends the future will look like. It is the goal that application developers must build to. CMS has decided to adopt the concepts contained in Gartner's "good enough" architecture as the foundation for its target architecture.

3. TARGET ARCHITECTURE

Gartner has recently presented a set of architecture principles, called the "good enough" architecture. "Good enough" architecture is a philosophy for creating just-in time architecture that is flexible and promotes business agility. The objective is to create an agile architecture; one that is easily adaptable to accommodate changes in business models and technology. The focus is on being malleable, rather than perfect.

There are three principles of the "good enough" architecture:

1. <u>Be flexible</u> - Flexibility will be built in so that changes can occur in one business domain without the whole architecture being re-designed. CMS will create logical technology models that are independent of physical constraints to provide flexibility. The architecture will reflect the speed and depth of business change and be an enabler of change.

2. <u>Concentrate on the most-important pieces of the architecture</u> - Good enough architecture will be rooted in the short-term and provide guidelines, models, interfaces, definitions, and protocols for *immediate* use in the design and integration of new systems. CMS will create an architecture with agility as the foremost objective, so it can be continually tuned to new businesses and technology opportunities.

3. <u>Create an architecture that can be rapidly iterated</u> - An underlying assumption is that the architecture can be amended often. CMS will design an architecture that will be changed by building governance, organization structure and methods to ensure that it can be changed as often as necessary.

This approach to a target architecture represents a more pragmatic view than proffered in the past. CMS has accepted this approach and created a simple enterprise framework for its target technical architecture.

This target architecture applies to both CMS hosted systems and CMS Business Partners' systems.

4. TECHNOLOGY ARCHITECTURE

The standards in a completed architecture highlight and isolate products, applications, shared services, and infrastructure choices from each other. This allows CMS to have flexibility in product choice and application development tools while maintaining interoperability. It also helps CMS in the procurement process by providing a set of specifications that promotes interoperability and requires selective disposition of outdated products.

CMS requires prospective developers and contractors to adhere to the following specific guidance when designing new CMS IT systems and applications.

4.A.   Technology Approach

CMS is migrating to a three-zone, web-enabled, and secure infrastructure. In today's applications development environment, there are two significant platforms to develop, manage and utilize distributed computing: J2EE (Java 2 Platform, Enterprise Edition) and Microsoft .NET. It is generally difficult for an enterprise to adopt both platforms at the same time. CMS has adopted the J2EE platform. Consequently, .NET development at CMS is not included.

4.B.   Infrastructure Product Selection

CMS has selected the following products as the standard components of the target J2EE infrastructure:

Utilities and Services	Mainframe Products/Standards	Mid-tier Products/Standards
Operating System	IBM z/OS	Sun Solaris 9
Database Management System (DBMS)	DB2	Oracle 9i, UDB
Messaging	IBM WebSphere MQ	IBM WebSphere MQ
"Application Zone" Server	IBM WebSphere for z/OS	IBM WebSphere 5.1 for Sun
"Presentation Zone" Web Server	N/A	IBM HTTP Server, Sun JES Web Server
Java Developer Tools	N/A	J2EE SDK, WebSphere Studio
Programming Language	Java, COBOL	Java
Network Transport	TCP/IP	TCP/IP
Information Intelligence, Analysis, Report and Management Tools	SAS, QMF	Cognos Series & ReportNet, MicroStrategy (for large databases)
Statistical Analyses	SAS	SAS
Extract, Transform, Load (ETL)	IBM Utilities, BMC Unload, Informatica PowerCenter	Informatica PowerCenter
Metadata Integration and Repository Tool	CA Advantage Repository	Informatica SuperGlue
Data Modeling – Logical and Physical	N/A	ALLFusion ERwin Data Modeler
Data Model Management	N/A	ALLFusion Model Manager
Modeling Language	N/A	IDEF, UML
Test Tools	Expeditor	TestDirector, WinRunner, LoadRunner
Software Configuration Management	Endevor	MKS Integrity Solution
Database Access Language	QMF, SAS	SQL 92
Database Connection	IBM WebSphere MQ	IBM WebSphere MQ
DBMS Tuning	BMC Tools	Oracle Enterprise Manager
Content Management/Unstructured	N/A	IBM Content Manager
Data Interoperability	XML & XML Schema	XML & XML Schema
Network Authentication/Access	RACF	Java Enterprise LDAP (Sun ONE) or LDAP Proxy

Utilities and Services	Mainframe Products/Standards	Mid-tier Products/Standards
Requirements Management	N/A	DOORS
LDAP Authentication	N/A	Java Enterprise LDAP (Sun ONE) or LDAP Proxy
SAN Storage Management	Hitachi, SMS	Hitachi, SUN SAN Storage Foundation Suite
Backup	SMS	Veritas NetBackup
Clustering	N/A	Veritas Clustering
File Transfer	Connect:Direct	Connect:Direct
Identification and Authentication	RACF	TBD
Authorization/Logical Access Control	RACF	TBD
PKI Certificate Authority	N/A	TBD
Network Monitoring Services	Tivoli	Cisco Works, Tivoli
Anti-virus software	N/A	McAfee for Solaris
Health Standard Interoperability	HIPAA Transactions, CHI Adopted Standards	HIPAA Transactions, CHI Adopted Standards

Other COTS products that will be proposed for use at CMS will be compatible with the above products and standards.

5. CMS GUIDING DOCUMENTS

The following CMS documents provide high-level design guidance for all new systems and applications:

- *CMS Internet Architecture* (published in July 2003)
- *CMS Enterprise Messaging Infrastructure* (published in December 2003)
- *CMS Web-Enabled Application Architecture* (in preparation)
- *CMS Intrusion Detection System Internet Architecture and Design* (in preparation)
- *CMS Data & Database Architecture* (in preparation)

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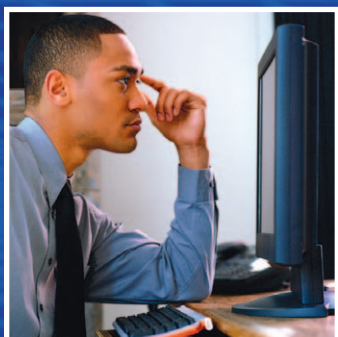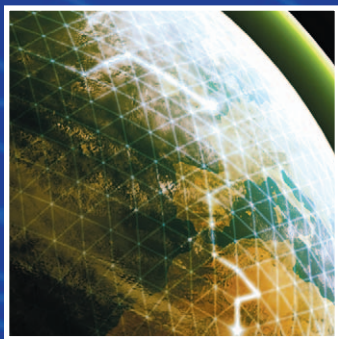
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